Group 2 Electives

# CMPUT 250

* **Course Description:**  
  An interdisciplinary course for students in Science, Arts, and other faculties. The focus is on games as interactive entertainment, their role in society, and how they are made. Teams composed of students with diverse backgrounds (e.g. English, Art and Design, and Computing Science) follow the entire creative process: from concept, through pitch, to delivery, of a short narrative-based game using a commercial game engine. To achieve the required mix of backgrounds and experience, students must apply to be considered for this course. See the Department web site for the online form.
* **Prerequisite:** Second-year standing
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Matthew Guzdial (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Matthew Guzdial's Rate My Professor rating is 4.9/5
* **Course Difficulty:** The course CMPUT 250 is known to have a significant workload, with a friend reporting that it took up most of his time while he was taking it alongside other courses. The course includes midterms, finals, labs, and a group project. The tests and labs are reported to be relatively easy, but the group project can be more challenging depending on the group. The average grade for the course is reported to be around 3.9, suggesting that putting in effort will likely result in a good grade. Getting into the course may involve being on a waiting list, as it is reported to be in high demand. For students taking the course as a music major, the amount of music required may depend on the game being developed, but it is possible to use online sources for royalty-free music. The use of RPG maker for the course means that less programming is required for the music role, but programming skills can still be helpful. Overall, the course is reported to have a substantial workload.

# CMPUT 304

* **Course Description:**  
  The second course of a two-course sequence on algorithm design. Emphasis on principles of algorithm design. Categories of algorithms such as divide-and-conquer, greedy algorithms, dynamic programming; analysis of algorithms; limits of algorithm design; NP-completeness; heuristic algorithms.
* **Prerequisites:** CMPUT 204; one of STAT 151, 161, 181, 235, 265, SCI 151, or MATH 181; and one of MATH 225, 227, or 228
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The course CMPUT 304 is reported to be difficult by several students, with some expressing frustration over the teaching style of the professor. They suggest that students may need to teach themselves the material and rely on external resources such as YouTube and StackOverflow. The course is described as having a low maintenance workload, with the homework being similar to quiz questions. However, some students mention that having taken the prerequisite course 204 beforehand would have been beneficial. Overall, the course is seen as having a significant amount of content to learn, and students may need to put in extra effort to fully understand the concepts.

# CMPUT 307

* **Course Description:**  
  An introductory course on the theory and applications of computer based 3D modeling and animation. The course will cover a selection of topics from overview of tools supporting modeling and animation, automatically generating 3D models, and animation of skeleton based models through algorithms and software. Applications of 3D modeling and animation in games, virtual/augmented environments, movies, and emerging video transmission algorithms will be discussed.
* **Prerequisites:** one of CMPUT 206, 308, or 411; or consent of the instructor
* **Terms the course is available in:**Winter Term 2024
* **Instructor(s):**Anup Basu (teaching in Winter Term 2024),
* **Instructor ratings:**Anup Basu's Rate My Professor rating is 4.3/5
* **Course Difficulty:** The course CMPUT 307 is considered difficult by some students, with prerequisites including one of CMPUT 206, 308, or 411, or the instructor's consent. Some students suggest taking 340 and 411 beforehand, as well as having a good understanding of 3D math and Linear Algebra II. The textbook for the course, 366, is criticized for being incomplete and poorly written, with assignments taking a long time to be marked and exams focusing on formula memorization. Some students question the value of the course and suggest considering alternative options, such as 403.

# CMPUT 325

* **Course Description:**  
  A study of the theory, run-time structure, and implementation of selected non-procedural programming languages. Languages will be selected from the domains of functional, and logic-based languages.
* **Prerequisites:** CMPUT 201 and 204 or 275; one of CMPUT 229, E E 380 or ECE 212, and MATH 125
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Jia-Huai You (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** Based on the comment, it seems that the midterm questions in CMPUT 325 are similar to the current assignment. This suggests that the course may have a strong emphasis on applying concepts learned to real-world problems. The fact that someone who has taken the course before is able to recognize the similarity between the midterm questions and the current assignment indicates that the material may be challenging but not entirely new. Overall, the course may be considered moderately difficult, with an emphasis on problem-solving and application of concepts.

# CMPUT 350

* **Course Description:**  
  This course focuses on state-of-the-art AI and graphics programming for video games. Part 1 introduces C++, the language of choice for video game engines, emphasizing efficiency, safety, the Standard Template Library, and OpenGL. Part 2 on real time strategy deals with efficient pathfinding algorithms, planning, and scripting AI systems. Student projects give hands-on experience directly applicable to the video games industry.
* **Prerequisites:** CMPUT 201 or 275, and 204
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The comments suggest that CMPUT 350 is a challenging course, particularly in the area of algorithms and performance. Students are advised to stay on top of the material, practice consistently, and not fall behind. They also recommend taking prerequisite courses such as CMPUT 201, 204, and 301 to prepare for the course. Some students have reported struggling with the labs and the workload, which can be overwhelming. It is also mentioned that the TAs are supportive and helpful resources for students. Overall, the consensus seems to be that CMPUT 350 is a difficult but rewarding course for those who are persistent and dedicated.

# CMPUT 366

* **Course Description:**  
  This course provides an introduction to search and planning in artificial intelligence. The course covers deterministic single-agent and multi-agent problems. Students will learn how to model real-world problems as state-space search problems and how to solve such problems. The course covers algorithms for solving deterministic shortest path problems with factored and non-factored states, combinatorial optimization problems, constraint satisfaction problems, and multi- agent problems.
* **Prerequisites:** CMPUT 204 or 275, and CMPUT 272
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024
* **Instructor(s):**Levi Santana de Lelis (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** The comments suggest that CMPUT 366 is generally considered to be an easier course, especially in the beginning, as long as one can understand the theory. However, some find the neural network material in the later part of the course to be more challenging. The course is seen as a good introduction to AI techniques and has provided a solid foundation for some students. However, it may not be as useful in industry for those without advanced degrees. Some students have had negative experiences with the course, finding the assignments to be a pain and the class chaotic. The absence of Dr. Sutton, who is highly respected, is a concern for some.

# CMPUT 391

* **Course Description:**  
  This course covers the implementation of RDBMSs and some non- relational data models, along with their query languages. Topics: compilation, execution, and optimization of SQL queries; concurrent execution of transactions; indexing; advanced constructs in SQL; semi-structured data models and query languages; distributed and parallel databases; NoSQL and cloud-based database systems.
* **Prerequisites:** CMPUT 201 and 204, or 275; and CMPUT 291
* **Terms the course is available in:**No term decided yet/not offered this year
* **Instructor(s):**No instructor teaching the course
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The comments suggest that the course CMPUT 391 can be quite challenging, with some students expressing concerns about the difficulty of the final exam and the harsh marking. The course material covers the in-depth workings of a DBMS, including algorithms for table scans, joins, and various types of databases. Some students have had negative experiences with the TAs and professors, while others have found the course useful and enjoyable. The course now uses SQLite3 and C for the assignments, and students can work in groups on some assignments. The final exam is worth a significant portion of the overall grade, which has caused concern for some students. Some students have suggested that the course material and structure have changed recently, and that the harsh marking and difficult final exam are characteristic of the professor. Some students have expressed mixed feelings about the course, finding the theoretical material interesting but the assignments and TAs difficult. Overall, the comments suggest that the course is challenging and requires a strong understanding of database systems and SQL.

# CMPUT 404

* **Course Description:**  
  Introduction to modern web architecture, from user-facing applications to machine-facing web-services. Topics include: the evolution of the Internet, relevant technologies and protocols, the architecture of modern web-based information systems, web data exchange and serialization, and service-oriented middleware.
* **Prerequisites:** CMPUT 301 and 291, or consent of the instructor
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Hazel Campbell (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Hazel Campbell's Rate My Professor rating is 1.7/5
* **Course Difficulty:** The course CMPUT 404 is considered to be difficult, with a heavy workload comparable to CMPUT 301. It covers topics such as JavaScript, Ajax, HTML/CSS, webservers, websockets, REST APIs, and Django/Flask backends using Python. The professor, Hindle, is highly regarded and is known for his excellent teaching. Prior experience with the languages is not required, as the course is designed for newcomers. The course load is considered to be heavy, but manageable, and the professor offers both in-person and online options. Deadlines are strictly enforced. The course covers both front-end and back-end development, and includes the use of Heroku and GitHub for CI and deployment. Essays may be required at the beginning of the course. The professor, Sharon, offers both in-person and online options and has thorough explanations. The course is taught in the Winter term as well.

# CMPUT 411

* **Course Description:**  
  2D and 3D transformation; 3D modeling and viewing; illumination models and shading methods; texture mapping; ray tracing.
* **Prerequisites:** CMPUT 204 or 275, 301; one of CMPUT 340, 418 or equivalent knowledge, and MATH 214
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Pierre Boulanger (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Pierre Boulanger's Rate My Professor rating is 2.8/5
* **Course Difficulty:**Insufficient information available on course difficulty

# CMPUT 415

* **Course Description:**  
  Compilers, interpreters, lexical analysis, syntax analysis, syntax- directed translation, symbol tables, type checking, flow analysis, code generation, code optimization.
* **Prerequisites:** one of CMPUT 229, E E 380, or ECE 212, and any 300-level Computing Science course
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** CMPUT 415 is a challenging course with a significant workload. Students are required to complete three assignments, the last two of which are particularly intensive. The course covers a lot of material, and students should be prepared to study extensively for the midterm and final exams. Additionally, students will be working on a project to implement a compiler for a defunct IBM language using LLVM and Antlr. The project is complex and most groups did not finish all the features in the given timeframe. Java knowledge is essential, and familiarity with different assembly dialects and LLVM is recommended. The workload is constant, and students are encouraged to start working on the next assignment as soon as the previous one is completed. Overall, CMPUT 415 is a demanding course that requires a significant time commitment but offers valuable learning experiences.

# CMPUT 466

* **Course Description:**  
  Learning is essential for many real-world tasks, including recognition, diagnosis, forecasting and data-mining. This course covers a variety of learning scenarios (supervised, unsupervised and partially supervised), as well as foundational methods for regression, classification, dimensionality reduction and modeling. Techniques such as kernels, optimization and probabilistic graphical models will typically be introduced. It will also provide the formal foundations for understanding when learning is possible and practical. Credit cannot be obtained for both CMPUT 367 and CMPUT 466.
* **Prerequisites:** CMPUT 204 or 275; MATH 125; CMPUT 267 or MATH 214; or consent of the instructor
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024
* **Instructor(s):**Bailey Kacsmar (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** The course CMPUT 466 is considered to be quite challenging, with a heavy emphasis on calculus, statistics, and probability theory. Some students may find it easier than others depending on their background in these areas. The course covers machine learning methods and requires a strong understanding of the underlying mathematical concepts. Prerequisites for the course include STAT 265, 266, 371, and 372, which also have a strong mathematical focus. Some students may find alternative courses or resources more suitable if they struggle with math or prefer a more systems/data management approach. The course includes assignments, exams, a final project, and weekly thought questions. The final project is considered to be relatively easy and can be a fun opportunity to apply machine learning methods to a dataset of interest. However, the assignments and exams can be quite challenging for some students, particularly those with weaker math backgrounds. The exams do not require memorizing formulas, but rather an understanding of the underlying concepts and the ability to communicate them clearly. Overall, CMPUT 466 is recommended for students interested in machine learning and data science, but may not be suitable for those with weaker math backgrounds or those preferring a more systems/data management approach. Alternative resources, such as courses on Coursera, may be available for students who wish to learn machine learning concepts but are unable to take the prerequisite courses or cannot handle the mathematical demands of CMPUT 466.

# ECE 360

* **Course Description:**  
  Linear system models. Time response and stability. Block diagrams and signal flow graphs. Feedback control system characteristics. Dynamic compensation. Root locus analysis and design. Frequency response analysis and design. Credit may be obtained in only one of ECE 360, ECE 362, E E 357, E E 462 or E E 469.
* **Prerequisites:** ECE 203 or E E 250, and ECE 240 or E E 238
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Tongwen Chen (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Tongwen Chen's Rate My Professor rating is 3/5
* **Course Difficulty:** ECE 442, also known as multimedia signal processing, is generally considered to be one of the easier courses in the ECE curriculum. The course covers topics related to machine learning, but the overall difficulty is relatively low compared to other ECE courses. If you have any specific questions or concerns, it may be helpful to consult resources such as the ECE labs discord or the e-class discussion board. The confusion seems to be related to either the lecture content or the project itself.

# ECE 370

* **Course Description:**  
  Review of vector calculus, electrostatics, and magnetostatics. Electric and magnetic fields in material media, including polarization mechanisms and general boundary conditions. Solutions to static field problems. Maxwell's equations and waves in free space, dielectrics and conducting media. Reflection and refraction, standing waves. Credit may be obtained in only one of ECE 370 or E E 315.
* **Prerequisites:** MATH 102, 209 and PHYS 230
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The course ECE 370 is difficult, with the professor in question being described as having a terrible teaching style, not providing proper examples, and being biased towards certain students. Despite this, some students were still able to do better than expected in the course.

# ECE 380

* **Course Description:**  
  Basics of analog communication: amplitude, angle, and analog pulse modulation; modulators and demodulators; frequency multiplexing. Basics of digital communication: sampling, quantization, pulse code modulation, time division multiplexing, binary signal formats. Credit may be obtained in only one of ECE 380 or E E 390.
* **Prerequisite:** ECE 240 or E E 238
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Xingyu Li (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 405

* **Course Description:**  
  Introduction to the principles of biophysical instrumentation. Various sensors are examined including strain gauges, inductive, capacitive, thermal, and piezoelectric sensors. Methods of measuring blood pressure are discussed. Origin of biopotentials; membrane and action potentials. Measurement of bioelectrical signals such as the ECG and EMG. Electrical safety, noise, impedance matching, and analog-to-digital conversion. Applications of electrodes, biochemical sensors, and lasers. Credit may be obtained in only one of ECE 405 or EE BE 512.
* **Prerequisite:** ECE 203 or E E 250 or consent of the Instructor
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** ECE 405, Biophysical Instrumentation and Measurement, is a very under-enrolled course, with only around 50 students taking it per semester for the past dozen years. The course is known for its heavy emphasis on calculations and theoretical questions, which can make it challenging for some students. However, the material is generally considered to be interesting in its applications, and the professor, Zemp, is known for making the course dry but engaging. The midterm exams from previous years suggest that time management is a key factor in doing well in the course.

# ECE 406

* **Course Description:**  
  This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.
* **Prerequisites:**None
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 407

* **Course Description:**  
  This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.
* **Prerequisites:**None
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Instructor(s) undecided for Winter Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 423

* **Course Description:**  
  Topics include distributed communication models (e.g., sockets, remote procedure calls, distributed shared memory), distributed synchronization (clock synchronization, logical clocks, distributed mutex), distributed file systems, replication, consistency models, fault tolerance, QoS and performance, scheduling, concurrency, agreement and commitment, Paxos-based consensus, MapReduce and NoSQL datastores, cloud infrastructures and microservices.
* **Prerequisites:** CMPUT 379 and (ECE 487 or CMPUT 313)
* **Terms the course is available in:**No term decided yet/not offered this year
* **Instructor(s):**No instructor teaching the course
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 440

* **Course Description:**  
  Extension of sampling theory and the Fourier transform to two dimensions, pixel operations including gray-level modification, algebraic and geometric transformations. The design of spatial filters for noise reduction, image sharpening and edge enhancement, and some discussion of interpolation techniques. An introduction to the concepts of image restoration from known degradations and the reconstruction of images from parallel and fan projections. Credit may be obtained in only one of EE BE 540 or ECE 440.
* **Prerequisite:** ECE 340 or E E 338 or consent of Instructor
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 442

* **Course Description:**  
  Human visual/audio perception and multimedia data representations. Basic multimedia processing concepts, multimedia compression and communications. Machine learning tools for multimedia signal processing, including principle component analysis and Gaussian mixture modeling. Applications to human-computer interaction, visual-audio, and visual-text processing. Credit may be obtained in only one of ECE 442 or E E 442.
* **Prerequisites:** ECE 220 or CMPUT 275, ECE 342, MATH 102 or equivalent knowledge
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Li Cheng (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Li Cheng's Rate My Professor rating is 2.5/5
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 447

* **Course Description:**  
  The course introduces basic concepts and techniques of data analysis and machine learning. Topics include: data preprocessing techniques, decision trees, nearest neighbor algorithms, linear and logistic regressions, clustering, dimensionality reduction, model evaluation, deployment methods, and emerging topics.
* **Prerequisites:** ECE 220 or CMPUT 275, and ECE 342 or STAT 235, or consent of instructor
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Marek Reformat (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Marek Reformat's Rate My Professor rating is 4.7/5
* **Course Difficulty:** ECE 447 is a new course in electrical and computer engineering, and based on the comments, it appears to be an introductory machine learning class with some data analysis components. The course is described as having a great professor and relatively easy assessments, but also being a bit disorganized. The programming aspect is not considered too difficult, especially for those with a background in software. Overall, the course seems to offer a solid introduction to machine learning and data analysis, but with some organizational challenges. The difficulty level is relatively low.

# ECE 449

* **Course Description:**  
  Intelligent systems for automatic control and data analysis. The concepts of vagueness and uncertainty, approximate reasoning, fuzzy rule-based systems and fuzzy control. Strategies for learning and adaptation, supervised and reinforcement learning, self-organization and the selection of neural network architectures. Discussion of the principles of search and optimization, evolution and natural selection and genetic algorithms. Introduction to hybrid intelligence. Applications of intelligent systems for pattern recognition, classification, forecasting, decision support, and control. Credit may be obtained in only one of CMPE 449 or ECE 449.
* **Prerequisites:**None
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The comments suggest that ECE 449 is primarily a programming course, with minimal need for lab equipment. However, for capstone projects, some components may be required. The lab setup for this course is described as having all necessary equipment and a storage space for projects. Overall, the course appears to be less lab-intensive compared to other ECE courses.

# ECE 455

* **Course Description:**  
  Microfluidic and nanobiotechnological devices. Fabrication techniques for devices: self-assembly, lithographic technologies. Applications of nanobiotechnology in computing, electronics, human health, environment and manufacture. Credit may be obtained in only one of ECE 455 or E E 455.
* **Prerequisites:** MATH 201 or PHYS 230
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Xihua Wang (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Xihua Wang's Rate My Professor rating is 4.5/5
* **Course Difficulty:** Based on the comments, ECE 455 appears to be a challenging course, with some students reporting that it is an "absolute ass." However, it may be required for graduation, and advisors may encourage students to enroll. A group II elective, such as 442, which covers machine learning, is suggested as an alternative and is reportedly more enjoyable and less difficult. Another comment indicates that 442 is focused on multimedia signal processing and is considered the easiest elective on the list. Therefore, the difficulty of ECE 455 can be described as significant.